OPERATING SUMMARY

ELORA

water pollution control plant

1967

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Elora Local Advisory Committee,
Village of Elora.

Gentlemen:

We are happy to present you with the 1967 Operating Summary for the Elora Water Pollution Control Plant, OWRC Project No. 2-0125-62.

Your co-operation with our staff throughout the year has been appreciated. Only with such co-operation can the war against water pollution be waged effectively.

Yours very truly,

D. S. Caverly,
General Manager.

#1

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

TELEPHONE 365-

J. A. VANCE, LL.D.
CHAIRMAN
J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER
W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Elora Water Pollution Control Plant, OWRC Project No. 2-0125-62.

The summary reviews progress during the year, outlines operating problems encountered and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

CONTENTS

ELORA

water pollution control plant

operated for

THE VILLAGE OF ELORA

by the

ONTARIO WATER RESOURCES COMMISSION

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DIRECTOR: D. A. McTavish

Assistant Director: C. W. Perry
Regional Supervisor: A. C. Beattie
Operations Engineer: B. W. Hansler

801 Bay Street Toronto 5

'67 REVIEW

A total of 23.573 million gallons of sewage was treated during the year at a cost of $6,770.25. This represents a 30 percent increase over the year as compared to the 18.142 million gallons of sewage treated in 1966. The cost per lb. of BOD removed in 1967 was $0.12 compared to $0.16 in 1966.

The average BOD and suspended solids in the raw sewage were 240 ppm and 447 ppm respectively. The water pollution control plant reduced the BOD and suspended solids concentration on an average with 95 percent and 97 percent efficiencies respectively. The average suspended solids concentration in the effluent of 14 ppm was below the OWRC objective of 15 ppm. Although the average effluent BOD concentration was 19.5 ppm, the average BOD in the effluent from June to December inclusive was 7 ppm which was well below the OWRC objective of 15 ppm.

In June 1967, the Sparjer coarse bubble diffusers were replaced under warranty with "Filtros" fine bubble diffusers.

During the year, both the Elora and Fergus Water Pollution Control Plants were operated by plant staff stationed at the Fergus Water Pollution Control Plant. Under the supervision of head office engineers, the plant staff operated a clean, attractive and efficient plant for the Village of Elora.

PROJECT COSTS

NET CAPITAL COST (Estimated)		$361,285.04
DEDUCT - Payments from Municipalities	$ 41,231.20	
- Portion Financed by CMHC (Estimated)	122,424.66	163,655.86
Long Term Debt to OWRC		$197,629.18
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967		$ 15,691.64
Net Operating		$ 6,370.25
Debt Retirement		3,989.00
Reserve		2,106.22
Interest Charged		11,143.92
TOTAL		$ 23,609.39

RESERVE ACCOUNT

Balance at January 1, 1967	$ 5,542.78
Deposited by Municipality	2,106.22
Interest Earned	356.87
	$ 8,005.87
Less Expenditures	(100.00)
Balance at December 31, 1967	$ 7,905.87

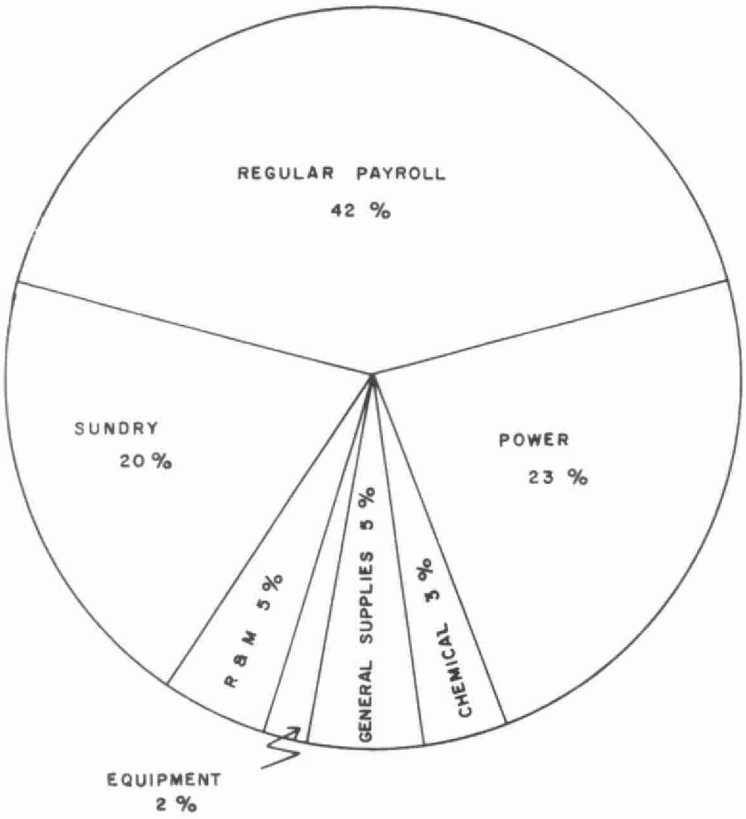
MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY
JAN	129.84		117.82					12.02
FEB	480.69	269.61	131.59		9.23			70.26
MARCH	540.35	155.27	124.69		15.13		168.65	76.61
APRIL	438.40	145.59	142.01		22.19	54.99		73.62
MAY	701.34	215.52	124.15	228.38	15.03		49.12	69.14
JUNE	578.75	285.93	131.59		15.35	74.50		71.38
JULY	719.28	283.97	117.90		26.69		19.37	271.35
AUG	545.65	326.98	121.57		81.35			15.75
SEPT	360.34	166.56	152.60					41.18
OCT	401.55	179.19	113.60		18.00		48.50	42.26
NOV	813.54	358.36	100.60		53.99		9.60	290.99
DEC	660.52	265.74	120.10		58.86		10.59	205.23
TOTAL	6370.25	2652.72	1498.22	228.38	315.82	129.49	305.83	1239.79

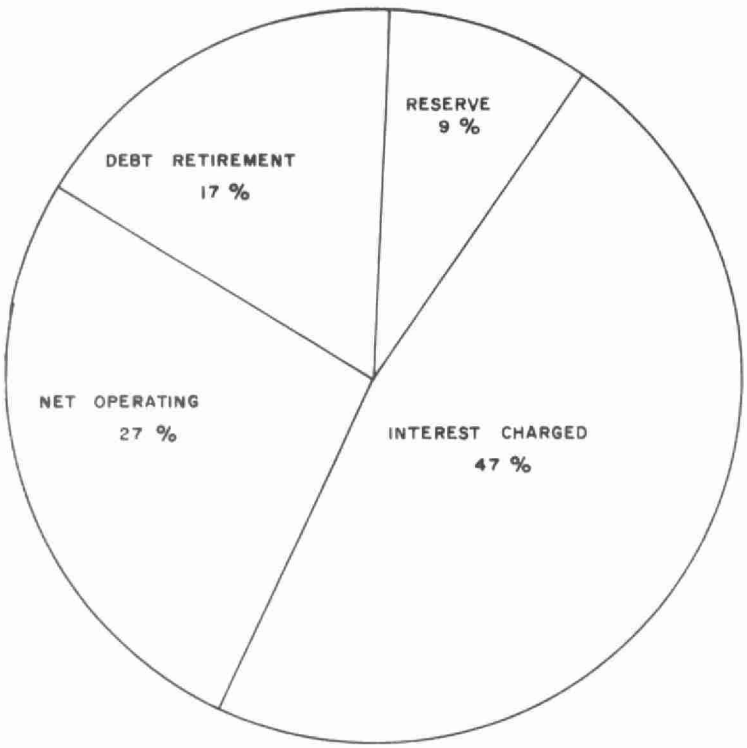
YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1965	13.111	$ 6679.39	509.45	32 CENTS
1966	18.142	6508.59	358.76	16 CENTS
1967	23.573	6370.25	270.24	12 CENTS

1967 OPERATING COSTS



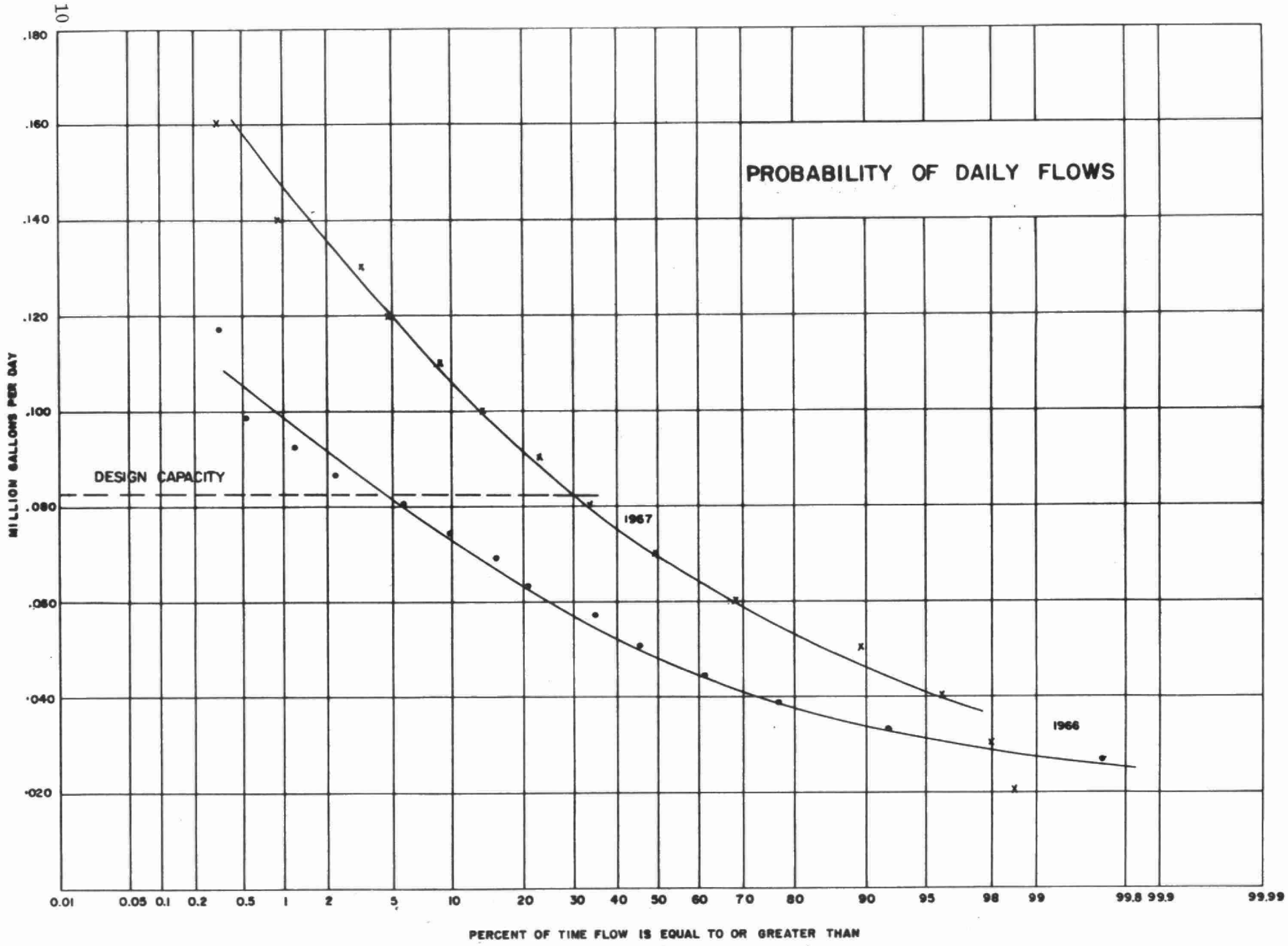
TOTAL ANNUAL COST



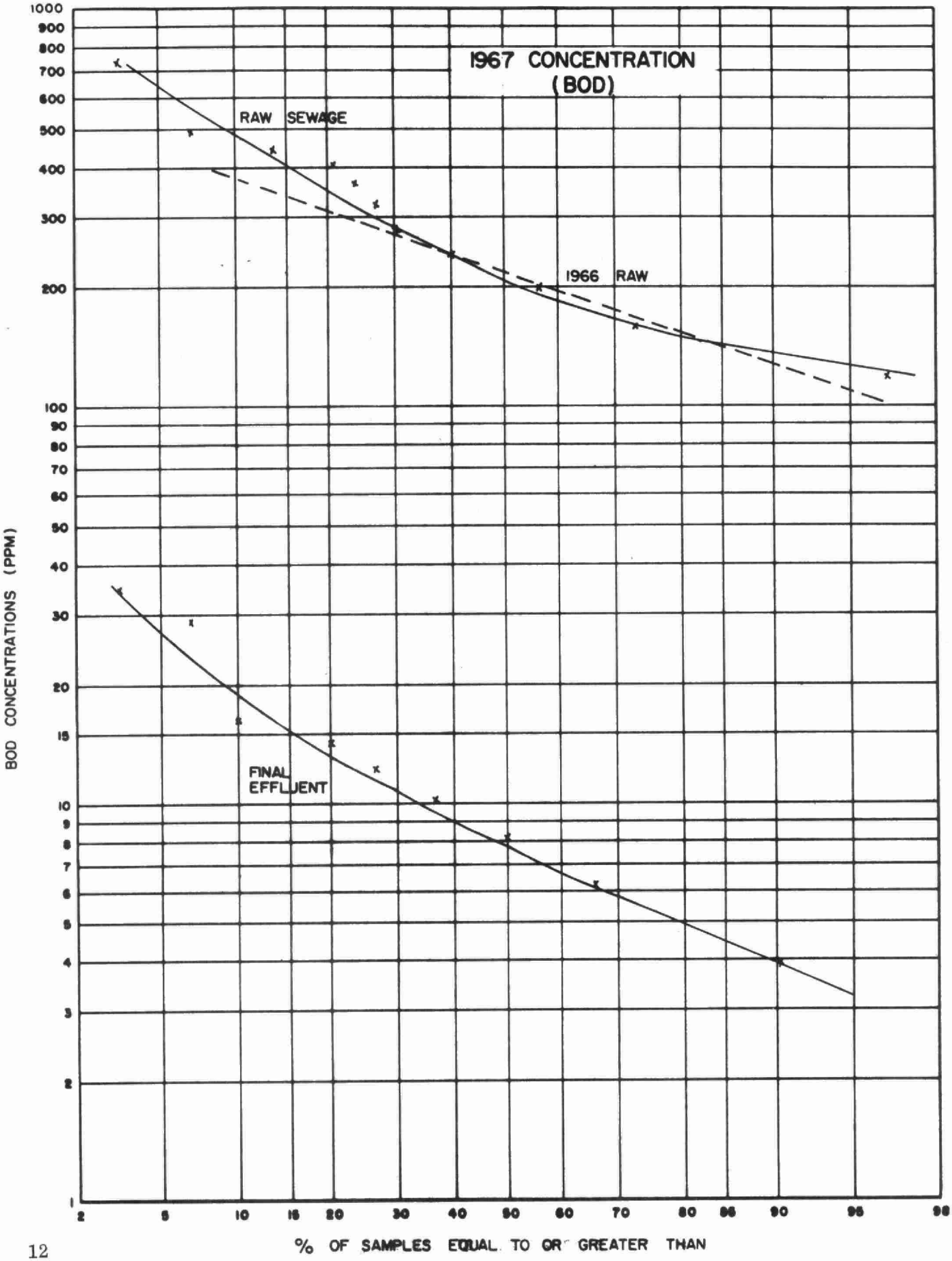
Process Data

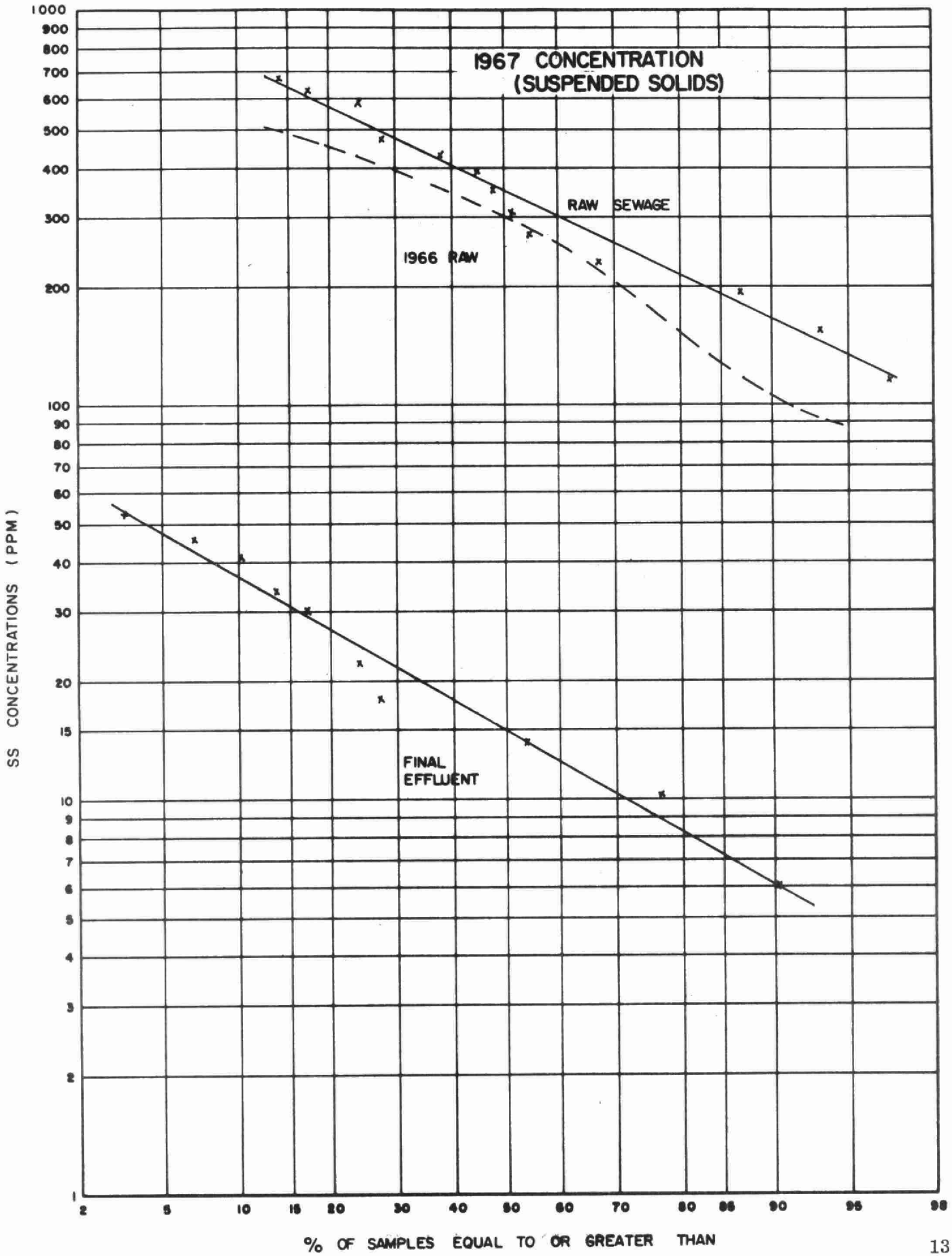
The average daily flow for 1967 was 64, 600 gpd. This represents 78 percent of the design average daily flow of 83, 300 gpd. During the past year, 23. 573 million gallons of raw sewage composed of both domestic and industrial wastes received complete treatment.

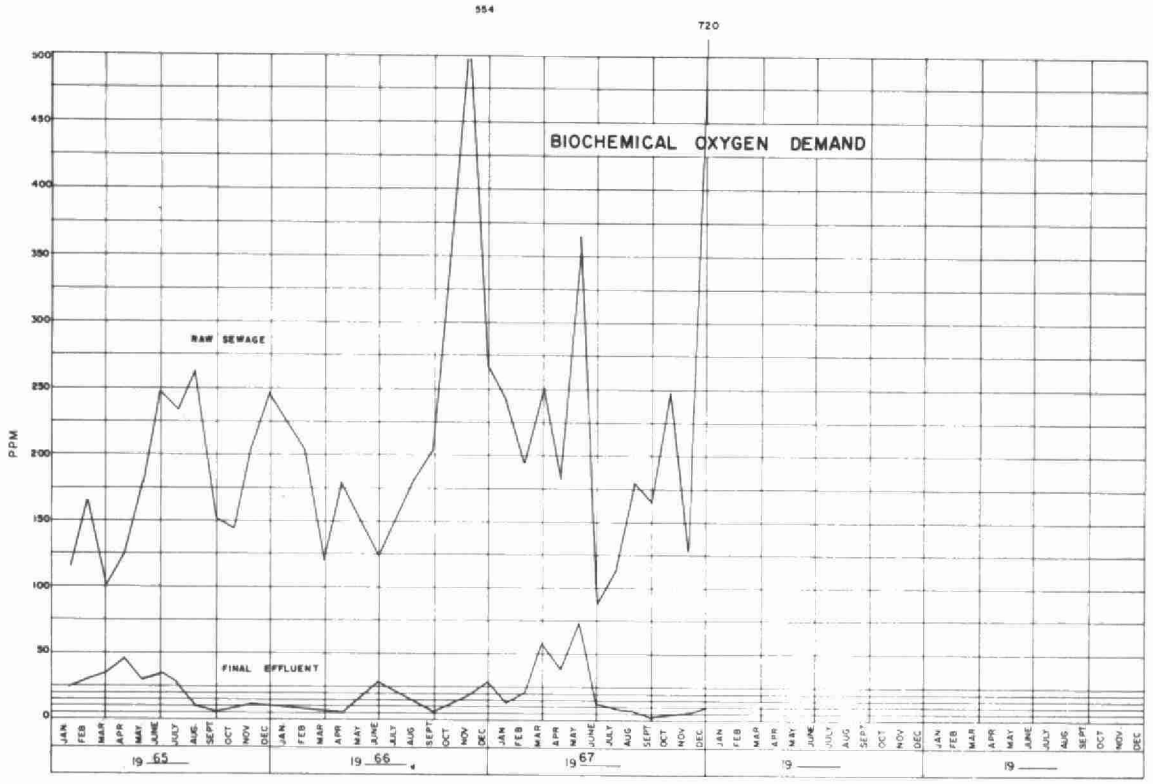
The maximum total daily flow averaged by month was 90, 600 gallons and occurred in April. The average daily flow of 64, 600 gallons was exceeded during the months of January, February, April, July and December. The design daily flow of 83, 300 gallons was exceeded 29 percent of the time.


PROBABILITY OF DAILY FLOWS
MILLION GALLONS PER DAY
.180
.160
.140
.120
.100
.080
.060
.040
.020
DESIGN CAPACITY
1967
1966
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN

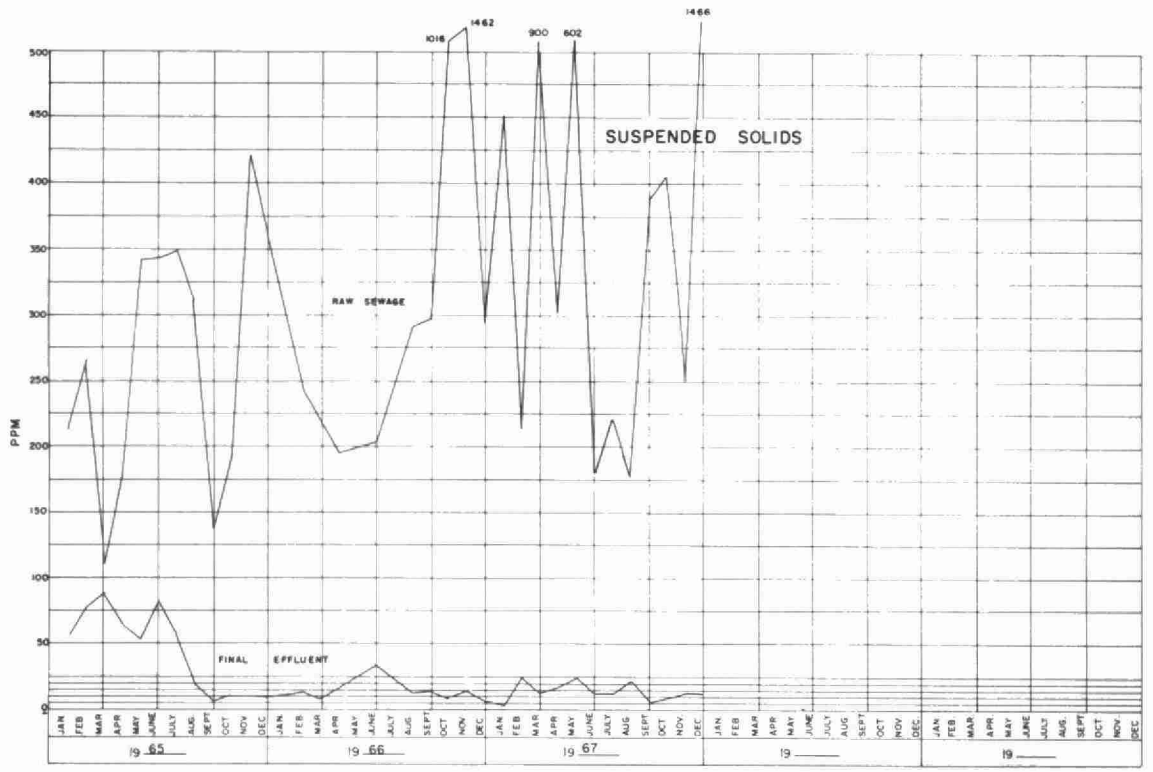

AVERAGE DAILY FLOW
MGD
.100
.090
.080
.070
.060
.050
.040
.030
.020
.010
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT OCT. NOV. DEC.
19 65
19 66
19 67
19 ____
19 ____


1967 CONCENTRATION
(BOD)
RAW SEWAGE
1966 RAW
FINAL
EFFLUENT
BOD CONCENTRATIONS (PPM)
% OF SAMPLES EQUAL TO OR GREATER THAN
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98


1967 CONCENTRATION
(SUSPENDED SOLIDS)
RAW SEWAGE
1966 RAW
FINAL
EFFLUENT
SS CONCENTRATIONS (PPM)
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% OF SAMPLES EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

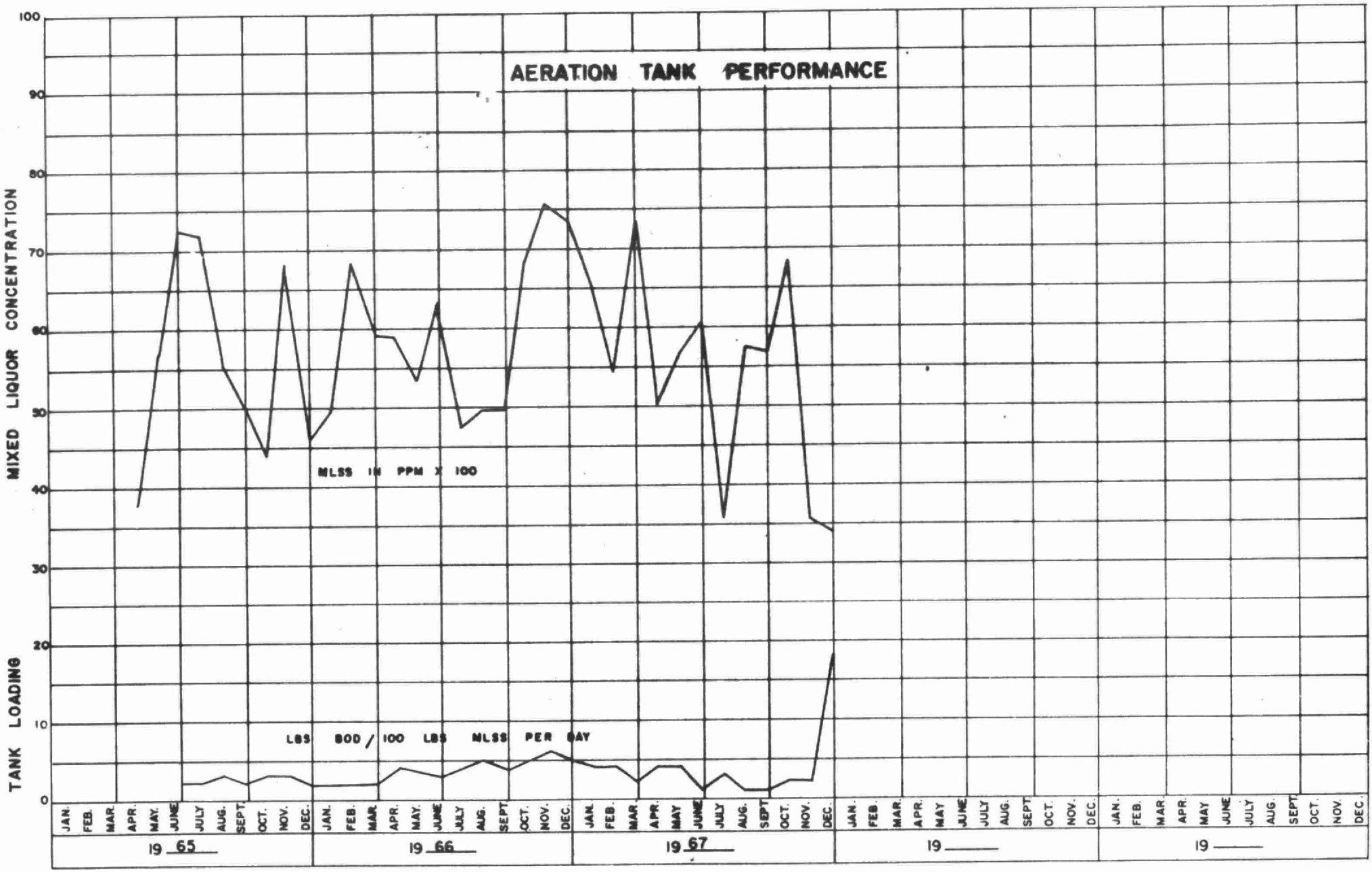
MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	241	11	95.4	3.00	454	3	99.3	5.88	15
FEB.	194	19	90.2	2.18	215	24	88.8	2.38	6
MAR.	251	57	77.3	1.60	700	12	98.3	5.68	15
APR.	182	37	79.7	1.97	304	17	94.4	3.90	19
MAY	365	72	80.3	2.59	602	23	96.2	5.12	17
JUNE	88	11	87.5	.72	179	12	93.3	1.57	12
JULY	113	6.6	94.2	1.30	222	12	94.6	2.57	11
AUG.	180	5.8	99.7	1.44	178	21	88.2	1.30	12
SEPT.	165	.9	99.5	1.14	388	6	98.4	2.65	5
OCT.	248	3.0	98.8	1.88	407	8	98.0	3.06	12
NOV.	128	3.7	97.1	.67	251	12	95.2	1.28	10
DEC.	720	7	99.0	8.42	1466	12	99.2	17.17	7
TOTAL	-	-	-	26.91	-	-	-	52.56	141
AVG.	240	19.5	91.6	2.24	447	14	95.3	4.38	12

COMMENTS

The average raw sewage BOD concentration of 240 ppm was 114 percent of the design concentration of 210 ppm and the raw sewage suspended solids concentration of 447 ppm was 179 percent of the design value of 250 ppm.

The average effluent suspended solids concentration of 14 ppm was below the OWRC objective of 15 ppm. However, the average effluent BOD concentration of 20 ppm exceeded the OWRC objective of 15 ppm. The water pollution control plant produced a poor effluent during the months of March, April and May. However, it should be noted that from June to December inclusive, the average effluent BOD was 7 ppm which is well below the OWRC objective of 15 ppm.

An average reduction of 92 percent and 95 percent for BOD and suspended solids respectively indicates that the plant provided very good treatment during the year.


AERATION TANK PERFORMANCE
MIXED LIQUOR CONCENTRATION
TANK LOADING
MLSS IN PPM X 100
LBS BOD / 100 LBS MLSS PER DAY
100
90
80
70
60
50
40
30
20
10
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
19 65
19 66
19 67
19 ____
19 ____

AERATION SECTION

MONTH	PRIM. EFFL * B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	241	6564	4	1856
FEBRUARY	194	5426	4	2308
MARCH	251	7355	2	3461
APRIL	182	5016	4	2727
MAY	365	5694	4	2156
JUNE	88	6050	1	7571
JULY	113	3581	3	5373
AUGUST	180	5742	1	4667
SEPTEMBER	165	5690	1	4413
OCTOBER	248	6855	2	2771
NOVEMBER	128	3571	2	6864
DECEMBER	720	3403	18	557
TOTAL	-	-	-	-
AVERAGE	240	5412	10	3727

* Raw BOD no prim.

COMMENTS

Except for the month of December, the average aeration tank loading was 3 lbs. of BOD per 100 lbs. MLSS which is in the recommended range of loadings for an extended aeration process. The aeration section of an extended aeration process will usually operate very well within a ratio of one to five lbs. of BOD per 100 lbs. of MLSS.

The average raw sewage BOD of 720 ppm during the month of December indicated a very strong sewage during this month. The water pollution control plant treated this sewage with no difficulty producing an effluent with an average BOD of 7 ppm.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	2.606	198	7.6
FEBRUARY	2.492	104	4.2
MARCH	1.652	134	8.1
APRIL	2.715	108	4.0
MAY	1.768	95	5.4
JUNE	1.879	81	4.3
JULY	2.446	86	3.8
AUGUST	1.656	100	6.0
SEPTEMBER	1.387	80	5.8
OCTOBER	1.536	74	4.8
NOVEMBER	1.074	81	7.5
DECEMBER	2.362	98	4.2
TOTAL	23.573	1239	-
AVERAGE	1.964	103	5.5

COMMENTS

The average chlorine dosage rate during the year was 5.5 ppm. Chlorine is used to disinfect the effluent. Chlorine was also used during the year on occasion to pre-chlorinate the return sludge in order to improve the settling ability of the MLSS.

CONCLUSIONS

The plant provided good treatment during the year producing an effluent with an average BOD of 19.5 ppm and suspended solids of 14 ppm. From June to December inclusive, the plant produced an effluent with an average BOD of 7 ppm.

The present arrangement utilizing the OWRC staff at the Fergus Water Pollution Control Plant to operate both the Fergus and Elora Water Pollution Control Plants proved successful and economical during the year.

RECOMMENDATIONS

Since the staff requirement at the plant still remains less than one operator, it is recommended that the present arrangement of staffing at the water pollution control plant be continued.


ONTARIO WATER RESOURCES COMMISSION